Place the sighting-rod in the hole in the mirror bar and hold it temporarily in place with the set-screw provided for that purpose. The pivoted vane bearing the white target should face toward the operator. Turn this vane down to the left. Pull down the shutter key and wedge the shutter open by some simple catch. A weight suspended on the end of a string tied to the pin on the sliding-bar of the screen will do.

Place one of the mirrors in the hole at the end of the bar and clamp in place by the catch underneath the bar for that purpose. Turn the mirror so that it stands in a plane parallel to the plane of the screen at right angles to the mirror bar.

Now sight through the hole in the centre of the mirror and over the point of the sighting-bar in the same manner that the peep sight and the front sight of a rifle are used, aiming at the distant station. These three points must be brought accurately into line by adjusting the position of the sighting-bar and the mirror. To do this loosen the winged nut on the head-bolt slightly and turn the mirror bar to the left or right. At the same time raise or lower the point of the sighting-bar. It requires some practice to perform this operation quickly. Care must be taken not to loosen the head-bolt too much and disturb the attachment of the mirror bar and screen.

When these three points have been brought into perfect alignment, clamp head-bolt and sighting-bar firmly, close the screen, turn the white target of the sighting-bar to a vertical position and then, by means of the tangent adjusting screws on the mirror, turn it on both its vertical and its horizontal axes until the small shadow spot cast by the unsilvered spot in the mirror falls exactly in the centre of the white target. A sheet of paper, held so as to intercept the reflected beam of light from the mirror about 6 in. in front of it, will assist in locating the shadow spot and in bringing it on to the target in this operation. The heliograph is now aligned and adjusted for signalling to the distant station but it is extremely important to note that the shadow spot must not be allowed to move off the centre of the target on the sighting-rod during operation.

3—Employment with Two Mirrors

When the sun is in the rear of the operator the second mirror and supplemental mirror bar must be employed. Place the main mirror bar on the tripod head first, and follow it with the supplemental mirror bar and the screen. Turn the supplemental bar into the position occupied by the main bar when using one mirror only, and place the screen at right angles to its long axis. In placing the screen, it should be put on in the reverse position with the sliding-bar and key on the left side, as the operator stands facing the distant station. Turn the main mirror far out in front of the screen (toward the distant station) and slightly to one side. In this position the two bars should form a wide obtuse angle. Place the two mirrors in position at the ends of the bars, and clamp. The purpose of the front, or sun mirror is to reflect the sunlight on to the station mirror from which it is reflected to the distant station. The front mirror is preferably swung out to the left and the operator takes up a position behind it where he is in easy reach of the adjusting screws and can readily watch the shadow spot on the white disk in the centre of the station mirror. When operating from this position, however, care must be taken not to permit the hand to cut off the light reflected from the sun mirror to the station mirror. A string or wire about 3 in. long with a ¾-in. ring on the end, suspended from the lug on the sliding-bar of the screen will be found to be the best equipment for operating a screen of this type.

Alignment with two mirrors is accomplished as follows: After setting up and placing mirrors as indicated with the station mirror approximately facing the distant station, the sun mirror facing the sun, and the screen wedged open, stoop down with the head near and in the rear of the station mirror and look over its top into the sun mirror. Turn the sun mirror by means of its adjusting screws until the whole of the station mirror is seen reflected in the sun mirror and the unsilvered spot and reflection of the paper disk accurately cover each other. Still looking into the sun mirror, adjust the station mirror until the reflection of the distant station is brought exactly in line